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ABSTRACT

The focus of research on cognitive processes has shifted toward an examination of the relationship between memory and interindividual differences of personality. A review of the research on two such personality traits (i.e., locus of control and field dependence-independence) shows that studies of locus of control as a factor in learning and memory have been concerned with verbal conditioning, awareness, demand characteristics, and levels of anxiety. Generally, internals when compared to externals were more prone to be aware of informational strategies for successful completion of tasks, less susceptible to experimenter influence, and more superior on retention/recognition in non-stressful situations. On the other hand, in threatening or high anxiety provoking situations, internals appeared to utilize repressor mechanisms and thus showed a decrement in information retention/recognition when compared to externals. In studies on field dependence (FD) and field independence (FI), it was found that FI individuals tended to engage in a hypothesis-testing, participant role in learning. They seemed to function on intrinsic motivation and were perceptive of the nonsalient cues in acquiring information relevant to the task. On the other hand, FD individuals tended to ignore nonsalient cues in the field and seemed to be motivated by extrinsic rewards. They were susceptible to social influence and tended to comply and conform to experimenter demands. Also, in stressful and/or threatening circumstances, FD individuals appeared to utilize repression and thus exhibited inferior or distorted recall. (The final portion of this review proposes research strategies and research topics for both locus of control and field dependence-independence studies as they relate to learning and memory.) (BL)

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LOCUS OF CONTROL, FIELD DEPENDENCE-INDEPENDENCE AS FACTORS IN LEARNING AND MEMORY

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Locus of Control, Field Dependence-

Independence as Factors in Learning and Memory

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Julian Rotter (1975), the noted social learning theorist and personologist, stated "At the present time, the influence of personality characteristics tends to be ignored or minimized by those working in other areas of psychology. Experimental psychologists who are interested in human learning, perception, and problem solving must sooner or later recognize that vast individual differences exist among people and that some of these differences fall within the realm of personality psychology." However, with the rebirth of interest in the cognitive processes, the focus of experimental work has shifted somewhat toward the relationship between memory and the more permanent interindividual differences of personality. My current research effort has unearthed some 30 studies dealing with the topic of individual differences and learning-memory in such areas as anxiety, introversion-extroversion, internal-external locus of control, and field dependence-independence. Johnson (1974), in an extensive review, discussed memory and personality based on an information processing approach. The author emphasized "control processes", defined as the strategies and decisions by which subjects use their memories in different situations. Individual differences, not surprisingly, would logically be expected in this dimension. Major dimensions of personality were discussed (extraversion, neuroticism, rigidity, anality, need achievement, and curiosity). In the clinical area, the section on psychopathology (hysteria, schizophrenia, paranoia, cyclothymia, and psychopathy) although interesting, revealed inconsistent and inconclusive findings. Clearly,

there is a dearth of research in this area as it relates to learning and memory, and future investigation is needed before conclusions can be drawn.

The focus of the present paper is to: 1) review pertinent research on locus of control, and field dependence-independence, 2) outline several research strategies for future research endeavors.

Locus of Control

Rotter developed from social learning theory a concept of internal-external control of reinforcement which describes the degree to which an individual believes that reinforcements are contingent upon his/her own behavior. Internal control refers to individuals who believe that reinforcements are contingent upon their own behavior, capacities, or attributes. External control refers to individuals who believe that reinforcements are not contingent upon their own behavior, capacities, or attributes. External control refers to individuals who believe that reinforcements are not under their own personal control but rather are under the control of luck, chance, fate, or powerful others. Lefcourt (1976) and Phares (1976) extensively review the I-E locus of control construct as a personality variable.

Although there appears to be an increasing interest in locus of control (LC) as a factor in conditioning, learning and memory, the results yield somewhat inconclusive findings. However, I will summarize several of the current research efforts in the area. Alegre and Murray (1974) investigated the relationship between LC, demand awareness (contingency and experimenter influence) and verbal conditioning. Congruent with prior LC research, the authors hypothesized that internals would resist attempts to manipulate or influence them while externals would be motivated to comply with social pressure or persuasion. The results indicated that verbal conditioning was greatest in externals, less in middle LC subjects, and least in internals.

Females conditioned better than males. LC was found to be predictive of verbal conditioning performance in clearly aware (cooperative) subjects. The findings were consistent with Rotter's formulation that internals would be more resistive to manipulation if they are aware of such manipulation. Jolley and Spielberger (1973) studied the effects of LC and state trait-anxiety on the performance of college females in a verbal conditioning task utilizing subtle experimenter influence. It was suggested that high trait-anxiety subjects generally perform better than low trait-anxiety subjects on verbal conditioning tasks under non-stressful experimental conditions. As predicted, aware subjects showed marked increases in conditioned responses over acquisition trials, and LC and trait anxiety had an interactive effect on performance; that is, the high-anxiety externals were more responsive to social reinforcement than high-anxiety internals. Interestingly, low-anxiety internals were more responsive to social influence than low-anxiety externals. This latter finding was explained in terms of the "defensive" nature of responding to LC questions by the high-anxiety group.

Prior LC research has indicated that internals appear to be more responsive to the informational strategies employed in successful completion of tasks. Utilizing a cue condition (CC) versus an irrelevant cued condition (ICC) task, Pines and Julian (1972) hypothesized that while internals' performance would vary with level of information processing difficulty, this variable would not be determinant of externals' performance. Eighty undergraduate females were arrayed in a 2 x 2 x 2 design which varied LC, level of difficulty (CC and ICC) and social evaluation (evaluator present or absent). As predicted, a significant LC x cue condition interaction showed that internals performed better in the relevant cue condition than the irrelevant cue condition, while externals were not significantly affected by cue conditions. On the other hand, a significant interaction of LC and social

evaluation (SE) showed that externals' performance was better in the high SE condition than in the low SE condition, while internals were unaffected by the SE conditions. Thus, internals appear to focus on the task requirements as a way of maximizing information relevant to successful task performance. Strickland (1970) examined the relationship of three individual difference variables--need for approval, LC, and verbal intelligence in a verbal conditioning task. Based on a post-experiment interview and recognition task, subjects were grouped according to their awareness of the response-reinforcement contingencies and the degree to which they admitted influence by the experimenter. Approval motivated subjects were more likely to acquire the reinforced response than were low need for appro al subjects. Subjects assessed as internal were more likely to deny influence by the experimenter. Also, subjects higher in verbal intelligence evidenced more awareness than subjects with lower intelligence scores. Strickland suggested that the inclusion of individual difference variable is of crucial importance to a clear understanding of the experimenter-subject interaction in the verbal learning situation.

In reference to the actual retention of information, Phares (1976) suggested the role of anxiety or threat in mediating differential retention in internals and externals. Lipp, Kolstoe, James, and Randall (1968) found that physically disabled externals showed lower recognition thresholds than physically disabled internals when pictures of physically handicapped persons were presented by tachistoscope. Apparently, externals have less need to deny the existence of threat because their externality gives them recourse to explanations that can deny any self-responsibility. In a related study, Phares, Ritchie, and Davis (1968) presented information to subjects regarding their personalities. Some of the information was positive and some was

negative. The results indicated that externals remembered a greater number of interpretations (both positive and negative) than the internals. Previous LC research suggested superior retention on the part of internals. The Lipp et al. (1968) and Phares et al. (1968) studies are the only works which indicated superior retention or recognition by externals. Piotrowski and Dunham (1983) reported differential perception of reality by internals and externals in an actual threatening versus non-threatening situation. Internals showed distorted (inferior ?) recall in the threatening situation only, when compared to externals. Perhaps internals when confronted with an external-type or threatening situation, have a need to deny (forget ?) the reality of the circumstances so as to reduce cognitive dissonance.

In summary, the majority of studies of locus of control as a factor in learning and memory are concerned with verbal conditioning, awareness, demand characteristics, and levels of anxiety. Generally, internals when compared to externals are more prone to be aware of informational strategies for successful completion of tasks, less susceptible to experimenter influence, and more superior on retention/recognition in non-stressful situations. On the other hand, in threatening or high anxiety provoking situations, internals appear to utilize repressor mechanisms and thus show a decrement in information retention/recognition when compared to externals.

Unexpectedly, my research indicated not a single study which utilized a paired associate or CVC type task for recall or recognition. Thus, the same comment applies to studies in short-term versus long-term memory, and also in the important area of organization in memory.

Field Dependence-Independence

Theoretically, field-dependence (FD) refers to individuals with a relatively global cognitive style, where experiences are governed by the organization of the field. Such individuals tend to use external referents in

situations and they are particularly attentive to social stimuli. Also, FD people are likely to take the organization of the field in perceptual and problem-solving tasks as given. Field-independence (FI) has been defined as the ability to overcome embedding contexts in perceptual functioning, and it is considered to be the analytical aspect of an articulated mode of field approach as expressed in perception. FI individuals tend to have a sense of separate identity, with internalized values and standards that permit them to function with a degree of independence of the social field. FD-FI is most commonly assessed by the Embedded Figures or Rod-and-Frame Tests.

Goodenough (1976), in an extensive review, surveyed studies on four major areas of work relating FD-FI to behavior in the learning-memory domain--cue salience in concept attainment, participant versus spectator roles in learning, repression as a factor in forgetting, and social orientation. I will summarize some of the pertinent research within these areas, as it applies to the current discussion.

In terms of informational strategy, some investigators (Camillus, 1973; Shapson, 1973) have found support for the notion that FD subjects tend to ignore nonsalient attributes of the field and make use of a "partist" strategy. In contrast, FI subjects were able to restructure the field as required by the task while utilizing both salient and nonsalient cues.

FI individuals are known for adopting an active, hypothesis testing, participant role in the learning process, and thus they possibly impose a mnemonic structure or reorganize associative material for more effective storage and retrieval. However, much research (Berent & Silverman, 1973; Fitz, 1970; Kazelskis, 1969; Orenstein, 1971; Sue, 1970) has evidenced inconsistent results and did not confirm the view that FI subjects are superior to FD subjects at associative learning in general. In a related light, relationships between FI and free recall are particularly interesting because it is clear that list

organization in the form of item clustering plays an important role in retention. Contrary to expectation, inconsistent results have been obtained (Kozelskis, 1970; Lezotte, 1969; Lohrenz and Gardner, 1973; Meshorer, 1969; Shapiro, 1970; Weiss, 1970). Lohrenz and Gardner (1973) studied the relationship of FD-FI to the recall of similar visual designs versus non-similar thematic materials. The subject pool consisted of volunteer adults aged 19-60. The results showed that FD was related to the recall of similar visual designs but not to the recall of thematic material. Weiss (1970) investigated the effects of cognitive organization on memory (recall and recognition). The findings indicated that both recall and recognition were moderately influenced by FD-FI; that is, FI subjects erred significantly less than FD subjects on recall and tended to be superior on number of words correctly recognized. Meshorer (1969) utilized a Mandler-type experiment and found that FI subjects were more highly organized than FD subjects in their approach to the categorizing and recall tasks. However, there were no differences between FI and FD subjects in recall itself. Thus, it appears that FD-FI is more related to <u>how</u> individuals learn than to <u>how much</u> is learned.

In terms of social orientation, it has been hypothesized that FD people are particularly susceptible to influence and conformity by external, social reinforcers. Riemer (1967) found that FD subjects became more aware than FI subjects of subtle, social (experimenter) reinforcement. Konstadt and Forman (1965) found that FD subjects were more affected by negative reinforcement than FI subjects; however, no significant relationship was found between FD and performance under conditions of experimenter approval. On the other hand, several studies concluded that FI subjects learned more effectively than FD subjects in the absence of extrinsic reward and punishment (Fitz, 1970; Steinfeld, 1973).

Memory for stressful versus neutral material has been studied and it was found that anxiety-provoking items were more difficult to recall than neutral items among FD subjects (Duvall, 1969; Weiss, 1970). It is interesting to note in this connection that studies of perceptual defense have consistently shown that FD subjects are more affected than FI people by stressful material in perception (Almgren, 1971; Duvall, 1969; Minard & Mooney, 1969). In a related study, Goodenough, Witkin, Lewis, Koulack, and Cohen (1974) studied dream recall from REM awakenings. This study involved the use of stressful and neutral films (prior to sleep). The results indicated that FD subjects more than FI subjects demonstrated impaired dream recall on "stress" nights. Thus it appears that the use of repression and/or denial of unpleasant events is related to FD-FI.

To summarize, FI individuals tend to engage in a hypothesis-testing, participant role in learning. They seem to function on intrinsic motivation and are perceptive of the nonsalient cues in acquiring information relevant to the task. On the other hand, FD individuals tend to ignore nonsalient cues in the field and seem to be motivated by extrinsic rewards. They are susceptible to social influence and tend to comply and conform to experimenter demands. Also, in stressful and/or threatening circumstances, FD individuals appear to utilize repression and thus exhibit inferior or distorted recall.

Associative learning and free recall experiments have fostered inconsistent findings. However, it appears that FD-FI subjects utilize differential modes of cognitive processing and organization (strategies), but not necessarily show superior recall or retention.

Implications for future research

It is quite obvious from the summary of locus of control and field-dependence field-independence research that the FD-FI dimension is the more popular

and fruitful area of investigation thus far. Perhaps, researchers view FD-FI as a cognitive style of processing, whereas LC is considered an isolated personality construct which deals with a generalized belief or attitude system. Regardless, it appears that the two concepts have much in common, the "FI-internal" individual seems to be active, autonomous, information seeking, aware of nonsalient cues in the field, less anxious, resistent to influence, analytical, and motivated intrinsically. Conversely, the "FD-external" individual appears to be passive, dependent, unaware of nonsalient cues, anxiety-prone, susceptible to social stimuli. Therefore, it appears logical to propose that in certain learning-memory investigations, identical results could be found for the FI-internal subjects, and for the FD-external subjects. If this formulation proved to be true, it would support the notion that the two constructs are somewhat identical (at least in terms of learning-memory).

In terms of LC, I would propose research strategies employing paired-associate learning, free recall, clustering and subjective organization type methodologies. Noteworthy, all studies thus far cited, utilized Rotter's I-E Scale. I propose using the Nowicki-Duke LC Scale, developed in 1974, which is designed for a college and non-college population, not related to social desireability or IQ, and is easily comprehended.

In terms of FD-FI, I feel the reasons for some of the inconsistent findings might be the fact that researchers have not necessarily utilized the Embedded Figures Test but some variant thereof. Also, some studies have not analyzed data separately for sex; nor have all studies controlled for IQ. Furthermore, the subject pool has varied as well as the explicit task instructions and methodology. In analyzing data groups, some authors used a median-split while others used extreme quartiles.

I propose that in subsequent research an attempt should be made to control for IQ, trait-anxiety; also, sex differences should be analyzed.

One approach would be to group the subjects into FI-internals, FI-externals, FD-internals, FD-externals and analyze data for differences. Possibly, subjects can be grouped on only one dimension (FI, FD, internal, external) and results can be compared.

Keeping the above proposals in mind, I sacrifice the following research "ideas."

a) Stages of memory have been ignored. A Peterson-Peterson type short-term experiment could yield effects of repetition on immedicate recall.

b) Long-term memory effects could be studied by a Mandler type experiment. FI-internals would be predicted to show superior subjective clustering and also total recall. Through post-experimental interview, subjects' organization strategies could be investigated.

c) Besides the standard verbal tasks, thematic materials, visual designs and memory for faces could be studied for differential retention.

d) Taffel-type design experiments could detect the effects of experimenter influence on performance. FI-internals should resist subtle persuasion; FD-externals might show improved retention under extrinsic reward conditions.

e) Since internals tend to be defensive in stressful situations and show inferior recall, and FI subjects, conversely, tend to be less repressive, this might prove to be an interesting area for inquiry. Fabricated negative feedback, pairing mild shock to neutral words, and viewing offensive words or materials are some suggestions for this type of investigation.

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(Note: DAI = Dissertation Abstracts International)

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